

Use of Virtual Network Simulator in Satellite and Terrestrial Interoperability Testbed

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Abstract:

This paper describes the use of the Mobile Satellite Protocol Testbed (MPST), a **hardware network emulator**, and the Virtual InterNetwork Testbed (VINT), a **software network simulator**, as a tool set for studying protocol behavior in global information infrastructure experiments involving a combination of satellites and terrestrial fiber optic networks.

The Mobile Satellite Protocol Testbed is a hardware based environment capable of accurately modeling the satellite channel using propagation data. Its goal is to assess and compare the various TCP and ATM protocol changes in a mobile satellite environment. The testbed can simulate a single link at rates up to 2 Mbps while VINT provides a framework for studying the effects of scale and heterogeneity on current and future network protocols. VINT also allows for the composing of simulation modules and for complex studies of interdependencies between protocols. The scale and bandwidth limits of VINT simulations are generally determined by the computing resources available, and simulations using data rates as high as 155 Mbps and above are achievable. The combined use of both hardware testbed and software simulation facilitates the study of complex protocol scaling and interaction in a laboratory environment.

An empirical error model is implemented in both the MPST and VINT, using propagation data to model a Ka-band satellite channel. Comparisons are then made between the results of the Mobile Satellite Protocol Testbed and the software-based Virtual InterNetwork Testbed.